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ABSTRACT

Two experiments were conducted to evaluate children's retention of premise and inference information from short stories. Thirty-two low-socioeconomic status (SES) black and 25 middle-SES white children (all 4th graders) served as subjects. The children were read nine short stories, each comprised of two premise statements and a filler sentence. The children were then tested by a recognition procedure involving 36 randomly presented test sentences. Four sentences (presenting true premise, false premise, true inference, and false inference) were associated with each story. Following a 60-second distractor task, subjects in the first experiment were asked to make yes/no recognition decisions based on whether the test sentence was identical to a sentence presented during the original reading of the stories. Consistent with the constructive (integrative) view of memory, middle-SES white children made few errors, except for true inference test sentences. Low-SES black children also had a high error rate for true inference items. It was suggested, however, that this outcome may not reflect integrative memory because they also had a high error rate for false inference items. Subjects in the second experiment were asked to make yes/no recognition decisions based on whether the test sentence was semantically congruent with original story content. Analysis of corrected recognition scores indicated that middle-SES white children retained more premise information than low-SES black children. However, the populations were equivalent in their retention of inference information. (Author/RH)

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Constructive Memory in Different Populations

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Abstract

Two experiments were conducted to evaluate children's retention of premise and inference information from short stories. Fourth-grade low-SES black and middle-SES white children served as subjects. The children were read nine short stories, each story was comprised of two premise statements and a filler sentence. The children were tested by a recognition procedure. Thirty-six randomly presented test sentences were presented. Four sentences were associated with each story (true premise, false premise, true inference, & false inference). Subjects in the first experiment were asked to make yes/no recognition decisions based on whether the test sentence was identical to a sentence presented at study. Middle-SES white children made few errors, except to true inference test sentences. This pattern of performance is consistent with the constructive (integrative) view of memory. Low-SES black children also had a high error rate to true inference items. However, this outcome may not reflect integrative memory because they also had a high error rate to false inference items. Subjects in the second experiment were asked to make yes/no recognition decisions based on whether the test sentence was semantically congruent with original story content. Analysis of corrected recognition scores indicated that middle-SES white children retained more premise information than low-SES black children. However, the populations were equivalent in their retention of inference information. The results from the second experiment indicate that low-SES black and middle-SES white children do not differ in their ability to integrate information in memory from short stories.

Constructive Memory in Different Populations

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A population group comparison frequently made in children's memory research has been between the performance of low-socioeconomic-status (SES) black and middle-SES white children. For example, studies using the method of paired-associates have generally demonstrated parity in the performance of children from these two groups during childhood (e.g., Rohwer, Ammon, Suzuki, & Levin, 1971). In contrast, research using the free recall procedure for randomly presented categorical items has indicated higher recall and category clustering for middle-SES white children relative to low-SES black children at the fourth grade and older (e.g., Jensen & Frederiksen, 1973). Jensen's Two-level Theory of mental abilities has provided one framework for the interpretation of these findings (Jensen, 1969). For example, the parity in paired-associate performance between the low-SES black and middle-SES white children appears to be consistent with Jensen's view that these populations do not differ in "rote" abilities (i.e., Level I), whereas the differences in categorical free recall favoring the middle-SES white children appears consonant with Jensen's view that these groups differ in "conceptual" abilities (i.e., Level II).

The foregoing interpretation, however, should be viewed with some caution. For example, substantial evidence exist which indicates that conceptual processes, like elaboration, are elicited in proficient paired-associate performance (see Rowher, 1973). Furthermore, recent studies using the release from proactive interference (PI) task indicate that low-SES black and middle-SES white children do not differ in their ability to automatically encode categorical information in memory (Kee & Helfend, 1977; Kee, Nakayama, Cervantes, & Osaze, 1981; Nakayama & Kee, 1980). This finding suggests that the categorical free recall differences reported may simply reflect differential use of taxonomic encoding strategies as opposed to a more basic difference between the groups in their categorical encoding capacity.

Generally speaking, evidence concerning the memory performance of low-SES black children in comparison to middle-SES white children has been limited to the list learning tasks previously described, such as paired-associates, free recall, and release from PI. In these studies, the focus has been on the retention of words or pictures. The aim of this study was to provide evidence concerning the memory abilities of children from these groups for more complex materials. To accomplish this, a modified version of the constructive memory task develcped by Paris and Carter (1973) was used. This task involves the retention of both premise and inference information from short stories. Each of these short stories was composed of two premises and a filler sentence. The following is an example of one of the stories:

The necklace is inside the sack.

The necklace is under the pillow.

The necklace is red.

After the presentation of a series of such stories, a recognition test was administered. The recognition test was comprised of four different types of test sentences for each story: a true premise (A sentence which is identical to a premise heard during presentation, e.g., "The necklace is inside the sack."), a false premise (A slightly altered sentence from the presentation set, e.g., "The necklace is under the sack."), a true inference (A sentence which was not heard before but was consistent with and could be inferred from the available information, e.g., "The sack is under the pillow."), and a false inference (A sentence which could not be inferred from the available information, e.g., "The sack is inside the pillow.").

Two experiments were conducted. The principal factors in the design of the first experiment were population membership (low-SES black and middle-SES white) as a between subjects factor and sentence type (premise vs. inference), and truth value (true vs. false) as within subjects factors.

Subjects were 32 low-SES black and 25 middle-SES white children from the fourth grade who attended schools in Los Angeles, California. The fourth grade level has been associated with population group differences in previous memory studies.

The materials consisted of nine short stories similar to the kind previously described. For the recognition test, 36 statements--comprised of a true premise, false premise, true inference, and false inference for each of the nine stories--were presented in a random order with the constraint that two

statements from the same story were not presented in sequence.

The subjects were tested in small groups of about 5 to 10 children. The children were told that they would hear some stories and that they should try to remember the stories because later they would be asked some questions about them. The stories were presented by a tape recorder at a 20 sec per story rate. Following the presentation of the nine stories, subjects engaged in a 60 sec distractor task which consisted of rating some numbers. At test, the 36 test statements were presented by tape recorder at a 15 sec rate and subjects were asked to indicate whether each statement was exactly the same as one heard during the original presentation of the stories by circling "yes" or "no" on a response sheet.

Figure 1 presents the results for the first experiment. The dependent variable selected for analysis was the number of errors made by the subjects to the different test sentences. Generally speaking, the pattern of performance for the middle-SES white children was similar to that originally found by Paris and Carter (1973). Children made few errors, except for inference items, suggesting that they accepted the nonpresented but semantically congruent true inferences as identical to premise sentences presented at study. This is a finding consistent with a constructive view of memory which suggest that children can actively construct and retain semantic information supplied across sentences (see Paris & Lindauer, 1978 for a more detailed discussion).

The low-SES black children also made many errors to true

inference items. However, whether this finding reflects the ability of these children to successfully integrate information in memory can not be determined because the low-SES black children's performance was also associated with high error rates to some of the other sentence types as well (e.g., false inference). The following effects were significant in the 2 x 2 x 2 analysis of variance performed: sentence type, $F(1,55) = 8.53$, population group, $F(1,55) = 21.14$: Sentence type x Truth value interaction, $F(1,55) = 31.03$: and a Population x Truth value interaction, $F(1,55) = 8.49$, $ps < .05$.

A second experiment was conducted in order to provide an additional and more decisive evaluation of the ability of children from low-SES black and middle-SES white populations to retain both premise and inference information from short stories. Recall that in the first experiment subjects were asked to base recognition decision on whether the test sentence was identical to a sentence heard at study. This experiment differed from the first in that subjects were asked to accept or reject test sentences based on whether they <u>meant</u> the same thing (i.e., semantic congruence) as sentences heard during the original story presentation. We reasoned that requiring subjects to make recognition decisions based on the meaning of sentences in this second experiment would provide a better indication of their ability to retain inference information in memory. In addition, the results from the first experiment suggest that low-SES black children may have a more liberal response criterion for accepting test sentences as old. Thus, response bias was taken into account in the second study by the use of a corrected recognition score.

With one exception, the materials and procedures for the second experiment were identical to those used in the first study. The major procedural difference was at test, the subjects were asked to indicate whether each statement meant the same thing as what was heard in the original stories. The subjects were 10 low-SES black and 10 middle-SES white fourth-grade children who attended the same schools which provided subjects for the first experiment.

Figure 2 presents the results for the second experiment. The dependent variable selected for analysis was a corrected recognition score; hits minus false alarms (i.e., acceptance of true premises minus acceptance of false premises or acceptance of true inferences minus acceptance of false inferences). A 2 x 2 analysis of variance with population (low-SES black and middle-SES white) as a between subjects factor and sentence type (premise vs. inference) as a within subjects factor, was performed.

The analysis revealed a significant main effect of sentence type, $F(1,18) = 10.03$, $p < .05$, which was qualified by a significant Population x Sentence type interaction, $F(1,18) = 5.02$, $p < .05$. Descriptively, this interaction indicates that while the two populations differed in their retention of premise information, equivalent performance was observed for the two groups for inference items. Analysis of error rates indicates that the population differences observed for premise items reflected a higher false alarm rate by the low-SES children relative to the middle-SES children, rather than differences in their acceptances of true premises as old items (i.e., hits).

The present study offers additional evidence concerning the memory abilities of children from low-SES black and middle-SES white populations. Distinguished from the majority of studies in this area which have been concerned with the learning of pictures and words in tasks such as paired-associates and free recall, the present study provided estimates of the ability of children from these two populations to retain premise and inference information from short stories. The results from the second experiment are particularly interesting because of the absence of population differences in the retention of inference items in memory. This outcome would appear to be inconsistent with Jensen's view. Recall that his Two Factor Theory predicts population differences in conceptual memory. Indeed, recent research (e.g., Kee & Helfend, 1977; Nakayama & Kee, 1980) has uncovered other types of conceptual memory tasks which are not associated with population differences, thereby suggesting that Jensen's dichotomy of skills into rote versus conceptual levels may not be sufficient to account for the rich pattern of memorial abilities displayed by children from diverse groups.

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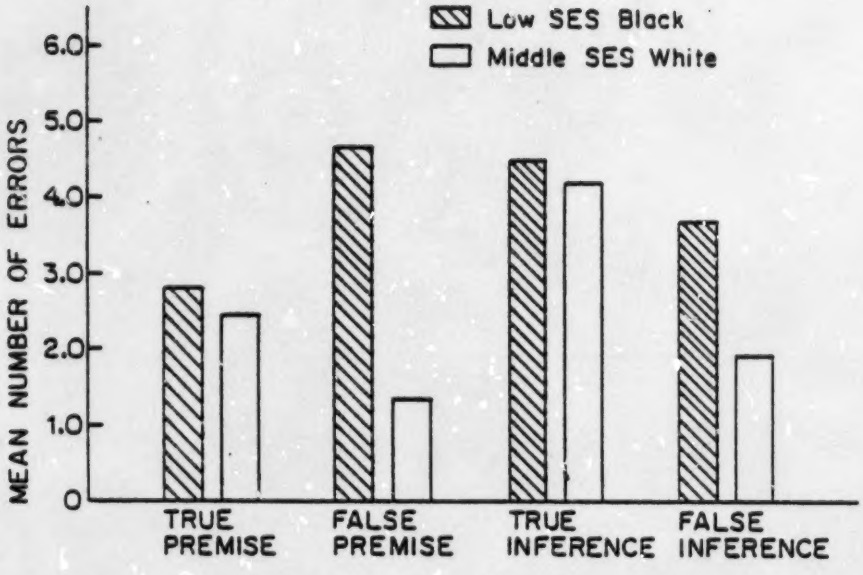

Figure 1. Experiment 1: Mean number of errors as a function of population membership, sentence type, and truth value.

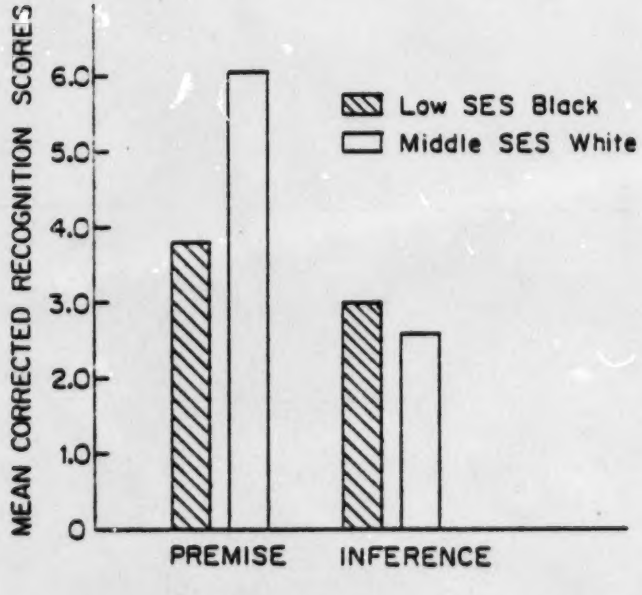

Figure 2. Experiment 2: Mean corrected recognition scores (hits minus false alarms) as a function of population membership and sentence type.